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SUMMARY

As a senior scientific engineer associate, I conduct various interdisciplinary research projects. I plan and design experiments, setup experimental systems, develop and/or verify analytical methods, characterize materials, formulate chemical compounds and solutions, and conduct instrumental analyses along with their maintenance and troubleshooting. Also, I manage the laboratories in good working condition and keep the laboratories in 100% HSE compliance. In addition, I provide required training for newly hired group members and supervise their daily activities in the labs.

Keywords: Research and Development; Formulation; Characterization; Interdisciplinary performance; Strong chemistry background; Instrumental analyses; Development of Analytical Methods; Collaboration; Design of Experiment; Lab Manager; Safety Compliance

INSTRUMENTAL SKILLS

1. Electron microscopy: SEM-EDAX /TEM
2. Elemental analysis: ICP-MS / ICP-OES / TOC-TIC / LSC / KPA
3. Chromatography: GC / HPLC / GC-MS/ IC / GPC
4. Spectroscopy: FTIR-DRIFT / UV-VIS / XRD / micro-XRD / XRF / NMR / MS
5. Thermal analysis: TGA / DTG / DSC
6. Others: / DLS / BET / Auto-titrator / pH meter / Turbidimeter / Microscopy / High Pressure System / Vacuum system / Ultracentrifuge

PROFESSIONAL EXPERIENCE

09/2007 - present: Senior Scientific Engineer Associate,

Lawrence Berkeley National Laboratory (1 Cyclotron Road, MS50A4037, Berkeley, California, 94720)

Description:

- Investigate possible utilizations of natural organic matters on enhanced oil recovery in combination with geological CO₂ storage.
- Design and Build up custom-made high pressure experimental systems for studying wettability alterations of various mineral surfaces by reactions with supercritical CO₂.
- Design and setup microfluidic system capable of wide pressure range from vacuum to high pressure.
- Formulate chemical compounds to study uranyl vanadate precipitations in various oxic & pH conditions.
- Formulate engineered nanoparticle suspensions in various ionic strengths and investigate their transport properties in porous media.

Accomplishments:

- Three unique high pressure experimental systems had been built and managed for good working conditions.
- Dewetting process of silica surface upon reaction with supercritical CO₂ was identified using engineered high pressure micromodel/microscope system.
- Total 48 batches were prepared and managed for investigating uranium vanadate precipitation in various oxic & pH conditions.

- Collaborate with scientists in Molecular Foundry (Berkeley, CA) to prepare and characterize engineered nanoparticles.
- Effects of cation/concentration/salinity/pH on the stability of nanoparticles were studied.
- Received three Spot Recognition Awards.

09/2006 - 08/2007: Principal Research Associate,

Lawrence Berkeley National Laboratory (1 Cyclotron Road, MS50A4037, Berkeley, California, 94720)

Description:

- Formulate chemical compounds for organic carbon supply in synthetic ground water and manage continuously ongoing column experiments.
- Anaerobically take soil samples from 32 soil packed columns and characterize them for studying redox change of Fe, Mn, S, and U.
- Formulate chemical compounds for studying vanadium adsorption on soil sediments in various oxic & pH conditions.
- Prepare and manage batch experiment sets for long term (more than 1 year) period.
- Develop and test analytical methods for vanadium analyses in aqueous mixture.

Accomplishments:

- Total 62 batches were prepared and managed to investigate the results of various formulations on vanadate adsorption.
- Collaborate with synchrotron beamline scientist to identify the precipitations from aqueous uranyl vanadate mixtures.
- Promotion was granted for my continuous hard working and achievements on research projects.

05/2005 - 08/2006: Senior Research Associate,

Lawrence Berkeley National Laboratory (1 Cyclotron Road, MS50A4037, Berkeley, California, 94720)

Description:

- Conduct soil-packed column experiments for studying redox changes of uranium and its transport through saturated sediments.
- Formulate chemical compounds for synthetic uranium waste solution to simulate the historical Hanford uranium spill event.
- Run experiments for investigating reactive transport of uranium in the Hanford vadose zone.
- Contribute on developing analytical methods for exploratory studies on soil carbon storage.

Accomplishments:

- Built 32 soil-packed columns in anaerobic condition and managed continuous experimental system.
- Collaborated with synchrotron beamline scientists and developed methods for uranium speciation in a sub-micron scale.
- Cooperated with scientists in National Center for Electron Microscopy and developed analytical method for soil-carbon mapping.
- Received Spot Recognition Award for my contribution and initiative on research projects.
- Promotion was granted for my continuous excellence in research and compliance for safety rules.

08/2000 - 05/2005: Research Assistant,

University of Southern California (925 Bloom Walk Street, Los Angeles, California, 90089)

Description:

- Characterize thermal properties of double layered clay minerals.
- Test adsorption properties of the double layered clay minerals under CO₂ atmosphere.
- Formulate chemical compounds for synthetic clay minerals and characterize the products for verification.

- Develop membrane preparation method with the double layered clay minerals.
- Test transport properties of the prepared membranes.

Accomplishments:

- Combination of in-situ analytical methods was developed to elucidate the thermal properties of the double-layered clay minerals.
- Collaborate with researchers in atomic scale molecular dynamic modeling group to show thermal evolution of the structure.
- Several preparation methods for a ceramic membrane were studied.
- Transport properties of the prepared membranes were studied.
- 3 papers had been published in scientific journals.

3/1/1997 - 2/28/1999: Research Assistant,

Seoul National University (1 Gwanak-ro, Gwanak-gu, Seoul, South Korea)

Description:

- Develop synthetic method for hyper-branched polymer.
- Formulate chemical reagents for multi-step reactions and optimize their compositions for higher yield.
- Characterize the synthesized polymer with various analytical instruments including photo luminescence, UV-VIS, GPC, NMR, and FT-IR.

Accomplishments:

- New synthetic method was developed using Heck reaction with organometallic Palladium catalysts.
- The synthesized polymers had been thoroughly characterized with various analytical instruments.

EDUCATION

08/21/2000 - 05/28/2006: University of Southern California, Los Angeles, California, United States

Doctorate, Major: Chemical Engineering

03/01/1997 - 02/28/1999: Seoul National University, Seoul, South Korea

Master of Science, Major: Chemical Technology

03/01/1993 - 02/28/1997: Seoul National University, Seoul, South Korea

Bachelor of Science, Major: Chemical Technology

PUBLICATIONS

Weishen Yang, **Yongman Kim**, Paul K. T. Liu, Muhammad Sahimi, and Theodore T. Tsotsis; A study by in situ techniques of the thermal evolution of the structure of a Mg-Al-CO₃ layered double hydroxide, Chemical Engineering Science, 57(15), 2945-2953, **2002**.

Yongman Kim, Weishen Yang, Paul K. T. Liu, Muhammad Sahimi, and Theodore T. Tsotsis; Thermal evolution of the structure of a Mg-Al-CO₃ layered double hydroxide: sorption reversibility aspects, Industrial & Engineering Chemistry Research, 43(16), 4559-4570, **2004**.

Nayong Kim, **Yongman Kim**, Theodore T. Tsotsis, and Muhammad Sahimi; Atomistic simulation of nanoporous layered double hydroxide materials and their properties. I. Structural modeling, Journal of Chemical Physics, 122(21), Art. No. 214713, **2005**.

Jiamin Wan, Tetsu K. Tokunaga, **Yongman Kim**, and R. Jeffrey Serne; Effect of saline waste solution infiltration rate on uranium retention and spatial distribution in Hanford sediments, *Environmental Science and Technology*, 42(6), 1973-1978, **2008**.

Tetsu K. Tokunaga, Jiamin Wan, **Yongman Kim**, Steve R. Sutton, Matthew Newville, Antonio Lanzirotti, and William Rao; Real-time X-ray absorption spectroscopy of uranium, iron, and manganese in contaminated sediments during bioreduction, *Environmental Science and Technology*, 42(8), 2839-2844, **2008**.

Jiamin Wan, Tetsu K. Tokunaga, **Yongman Kim**, Eoin Brodie, Rebecca Daly, Terry C. Hazen, and Mary K. Firestone; Effect of organic carbon supply rates on uranium mobility in a previously bioreduced contaminated sediment, *Environmental Science and Technology*, 42(20), 7573-7579, **2008**.

Tetsu K. Tokunaga, Jiamin Wan, **Yongman Kim**, Rebecca Daly, Eoin Brodie, Terry C. Hazen, and Mary K. Firestone; Influence of organic carbon supply rate on uranium bioreduction in initially oxidizing, contaminated sediment, *Environmental Science and Technology*, 42(23), 8901-8907, **2008**.

Jiamin Wan, **Yongman Kim**, Tetsu K. Tokunaga, Zheming Wang, Suvasis, Dixit, Carl Steefel, Eduardo Saiz, Martin Kunz, and Nobumichi Tamura; Spatially Resolved U(VI) Partitioning and Speciation: Implications for Plume Scale Behavior of Contaminant U in the Hanford Vadose Zone, *Environmental Science and Technology*, 43(7), 2247-2253, **2009**.

Tetsu K. Tokunaga, **Yongman Kim**, and Jiamin Wan, Potential Remediation Approach for Uranium-contaminated Groundwaters Through Potassium Uranyl Vanadate Precipitation, *Environmental Science and Technology*, 43(14), 5467-5471, **2009**.

Saeed Torkzaban, **Yongman Kim**, Martin Mulvihill, Jiamin Wan, and Tetsu K. Tokunaga, Transport and Deposition of Functionalized CdTe nanoparticles in saturated porous media, *Journal of Contaminant Hydrology*, 118(3-4), 208-217, **2010**.

Yongman Kim, Jiamin Wan, Timothy J. Kneafsey, and Tetsu K. Tokunaga, Dewetting of Silica Surfaces upon Reactions with Supercritical CO₂ and Brine: Pore-Scale Studies in Micromodels, *Environmental Science and Technology*, 46(7), 4228-4235, **2012**.

Tetsu K. Tokunaga, **Yongman Kim**, and Jiamin Wan, Aqueous Uranium(VI) Concentrations Controlled by Calcium Uranyl Vanadate, *Environmental Science and Technology*, 46(14), 7471-7477, **2012**.

Tetsu K Tokunaga, Jiamin Wan, Jong-Won Jung, Tae Wook Kim, **Yongman Kim**, and Wenming Dong, Capillary pressure and saturation relations for supercritical CO₂ and brine in sand: High-pressure $P_c(S_w)$ controller/meter measurements and capillary scaling predictions, *Water Resources Research*, 49(8), 4566-4579, **2013**.

Jiamin Wan, **Yongman Kim**, Tetsu K Tokunaga, Contact angle measurement ambiguity in supercritical CO₂–water–mineral systems: Mica as an example, *International Journal of Greenhouse Gas Control*, 31, 128-137, **2014**.

Patent

Tetsu K Tokunaga, Yongman Kim, Jiamin Wan, Method of precipitating uranium from an aqueous solution and/or sediment, US 8512572, granted in August 2013.